GANPAT UNIVERSITY

B. TECH. SEMESTER VIIth CIVIL ENGINEERING
REGULAR EXAMINATION – NOV/ DEC- 2012
C–701:DESIGN OF CONCRETE STRUCTURE

Max.Time: 3 Hours   **Max. Marks: 70**

Instructions: - (1) Answer to the two sections must be written in **separate** answer books.

(2) Figures to the right indicate **full** marks.

(3) Assume suitable data if required.

(4) IS-456-2000 is permitted.

Section - I

Q.1 (A) What is a redistribution of moment? (3)

(B) A part plan of a banking hall is shown in figure1. The slab of 120mm is restrained with edge beams. Using M20 grade concrete and HYSD reinforcement of grade Fe415, designs slab S_1. Take floor finish load 1 KN/m^2 and live load 3KN/m^2. Also check for shear and deflection. (9)

OR

Q.1 (A) What is mat foundation? Where we should provide mat foundation. (3)

(B) Two reinforced concrete columns 700mm x 700mm (c1) and 650mmx 650mm (c2) in size carry axial loads of 1300kN and 1200 kN respectively. These columns are placed 4.4 m apart c/c. The safe bearing capacity of soil is 205 kN/m^2. Use M20 grade of concrete and Fe 415 grade of steel. Design the combined rectangular footing for (9)

1) Soil design

2) Find out s.f. and b.m diagram.

3) Find out reinforcement of footing.

Q.2 (A) What is an interaction diagram for column design? (3)

(B) Determine the reinforcement required for a column which is restrained against sway with the following data: Size of column = 350 mm x 300 mm, concrete grade = M 25, Steel grade = Fe 415, l_{ex} = 6.5m, l_{ey} = 4.5m, Unsupported length = 7.0m, Factored load = 1500 kN, Factored moment in the direction of larger dimension 40 kN.m at top & 22.5 kN.m, Factored moment in the direction of shorter dimension 30 kN.m at top 20 kN.m at bottom. (8)

OR

Q.2 (A) What are the do's details required for general drawing of slab as per SP34?

(B) A part plan of an R.C.C. floor is shown in figure 2. Design the beams B_3 and B_4. Total load on slab is $(4.5 + 3.5)$ KN/m^2 (i.e., DL + LL). Assume that the beams are not monolithic with the supports. Assume 230 mm x 500 mm rib of the beam and slab thickness of 120 mm. The materials are M20 grade concrete and HYSD reinforcement of grade Fe 415.

Q.3 Attempt any **Two**: (12)

(A) Draw general detailing for beam and slab as per IS 13920-1993.

(B) A T-beam has the following dimensions: (I) effective width of flange = 1500 mm (ii) thickness of slab = 120 mm (iii) width of rib = 300 mm (iv) effective depth = 540 mm (V) tension reinforcement = 3-28 Φ + 3-25 Φ (vi) concrete M-20 and steel Fe415 grade.

(C) Calculate Ultimate moment of resistance for Tee-beam with following dimensions: (I) flange 2000 mm x 120 mm (ii) rib 250 x 430 mm (iii) Steel in tension, 7 nos. of 20 mm dia. at eff. cover of 50 mm (iv) M-15 concrete and f = 415 N/mm^2.

Section - II

4 (A) Find the stiffness, α_c and correction of pattern loading if required for the given data of flat slab without drop and column head. (6)
Height of column = 5.0 m above and below slab, Live load = 3kN/m^2, Size of column = 300mm×400mm, Panel size = 4m ×5m, Grades: M20 and Fe415.

(B) Find the final moment on beam of the portal frame for given data: (6)
Slab size = 36m×18m, Portal frame spacing = 3.6m, Ceiling height = 4.5m
Supports are hinged, Use M20 grade of concrete and Fe415 grade of steel.

OR

4 (A) A reinforced concrete (single span) T beam bridge is to consist of 5 beams (12) 1.75m apart. The span of the bridge is 12m clear with end bearing of 600mm. The live load on the bridge 17000N/m^2 including impact. The carriageway over the bridge is to be 7m wide with a footpath of 1.5m width on other side. The loading on the footpath may be taken as 3900N/m^2. Design the bridge. Use M20 and Fe415.

5 (A) Design a cantilever retaining wall to retain a level earth of 3m above basement (11) level. The angle of repose of soil is 30°. The unit weight of soil is 16kN/m^3. The coefficient of friction between soil and concrete is 0.6. The S.B.C. of soil is 100kN/m^3. Use M15 concrete.

OR

A) Design the circular water tank for a capacity of 400 kilolitres with flexible base (11) i.e. walls and base are not monolithic with each other. Use mild steel bars for reinforcement.

(12)

6   Attempt any Two:

(A) Explain ADVANTAGES and DISADVANTAGES of Flat slab.
(B) Explain Earth pressure on Retaining wall in detail.
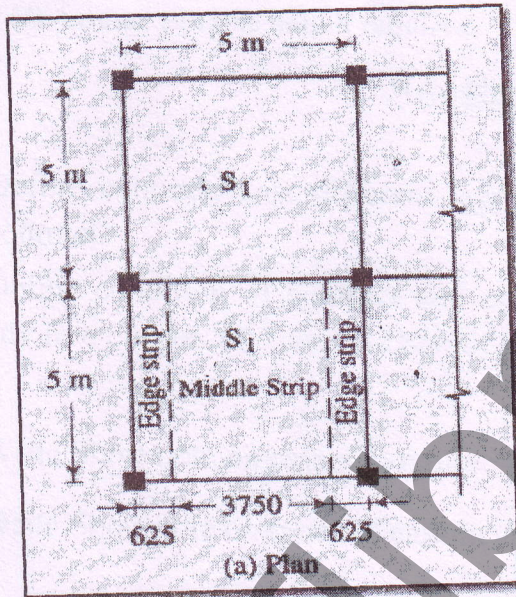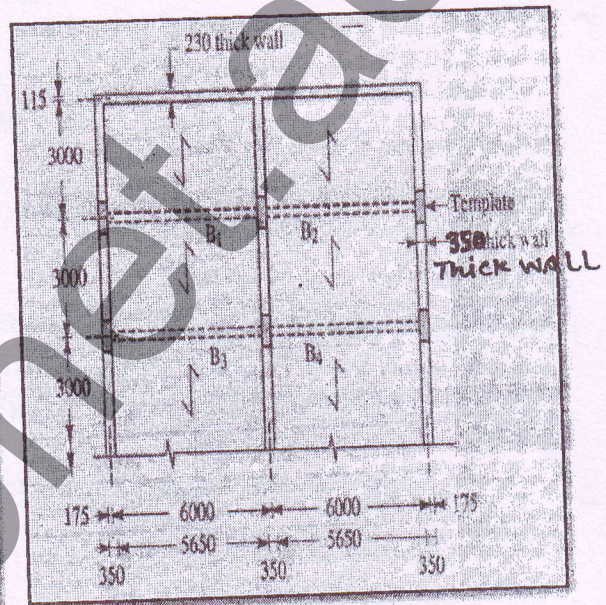(C) Draw figures of types of retaining wall.

Figure 1/ Que 1(B)

Figure 2 / Que 2(B) OR

"END OF PAPER"